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# TERMS OF TRADE INSTABILITY, ECONOMIC VULNERABILITY AND ECONOMIC GROWTH: THE ROLE OF INSTITUTIONS IN SUB-SAHARAN AFRICA

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## ABSTRACT

*Economists have a long argue that institutions and implementation of good governance are important for economic growth. The main objective of this research is to demonstrate that one of positive institutions effects is its ability to mitigate the negative effect of economic vulnerability linked to terms of trade fluctuations on economic growth. The impact of the economic vulnerability and implementation of good governance is estimated for a panel of 15 Sub-Saharan-Africa countries over the period 1996-2011. The results show that good institutional quality helps to undermine the negative effects of economic vulnerability on economic growth. It is also clear from this analysis that the interaction terms between trade openness and institutions can reduce the negative effects of economic vulnerability and that trade openness has a positive effect on economic growth only until a certain level of institutional quality.*



**Keywords:** Economic vulnerability, Instability of terms of trade, Economic growth, Institutions, Dynamic panel.

**JEL Classification:** O43, O47, C23.

## Contribution/ Originality

The main contribution of the paper is to show that the introduction of good governance and the development of good quality of institutions reduce significantly the negative effect of economic vulnerability on economic growth of 15 Sub-Saharan-Africa countries which are largely dependent on primary product exports.

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## 1. INTRODUCTION

The study of the impact of fluctuations in the terms of trade on economic growth has attracted for a long time the interest of several economists who have advanced arguments that specialization in the export of primary products is disadvantageous for economic growth. Among these arguments, we include the Prebisch-Singer. These latter argued that the commodity prices in the long term downward trend compared to the prices of manufactured goods. Changes experienced export earnings in the export of primary commodities affect economic growth due to the lack of export diversification and concentration of these countries on a limited number of trading partners. The impact of a decline in exports is still higher than the share of exports in GDP is stronger. This impact is mostly felt if the country is small (price taker), in this case the instability of prices of goods it exports is considered exogenous.

In this study, we focus on the Sub-Saharan-Africa region. Countries of this region, largely dependent on exports of primary products have undergone a decline in economic growth after the oil shocks of 1973 and 1979. Face to instability and deteriorating terms of trade, most of these countries did not follow appropriate economic policies to absorb these shocks. In addition, some of them characterized by poor quality of their institutions have seen their incomes fall as a result of political instability coupled with lower incomes in the export sectors. This dependence exports of these countries increasing the vulnerability of these economies.

Economic vulnerability is defined as the risk that a country can be affected by exogenous shocks. Two types of exogenous shocks may occur: internal shocks can be of natural origin, such as climate change, including drought, floods, etc. and external shocks such as changes in external demand, the volatility of terms of trade, and external financial shocks such as the global financial recession or crisis.

We use data from a sample of Sub-Saharan Africa countries which are heavily dependent on the export of primary commodities to investigate the effects of terms of trade instability on economic growth and to study the impact of the mode of governance and the interactions terms between trade openness and institutions on the economic growth. The focus on Sub-Saharan Africa countries reflects the intuition that if volatility matters at all, it should do so in the countries most dependent on primary products.

The remainder of the paper is organized as follows. In Section 2 we present a brief review of literature that discusses the effects of the instability of terms of trade on economic growth and the role played by institutions to reduce or amplify these effects. In Section 3, we describe the specification of the empirical model and present the results. Section 4 concludes.

## 2. REVIEW OF LITERATURE

A large literature on the issue of economic vulnerability in developing countries highlights the contribution of shocks of terms of trade and instability on economic growth.

According to a study by Mendoza (1997) of 40 industrialized and developing countries, the volatility of terms of trade reduces investment and thus reduces economic growth because of risk

aversion, while improved terms of trade leads to higher levels of investment and thus improve long-term economic growth. Similarly, Bleaney and Greenaway (2001) estimated a panel of 14 Sub-Saharan African countries between 1985 and 1995 in order to know the effect of terms of trade on economic growth and investment. They showed that economic growth and investment increase when there's an improvement in terms of trade while they are both negatively affected by the volatility of terms of trade. According to this study, the channel through which the instability of terms of trade affects economic growth is the investment and uncertainty.

Easterly *et al.* (1993), who analyzed the differences in long-term growth in a panel of countries, found that the impact of terms of trade instability play an important role in explaining the variance of the growth. Guillaumont *et al.* (1999) tested the effect of volatile terms of trade on economic growth. Their results show that the effects of shocks of terms of trade on economic growth are more important and significant in the countries of sub-Saharan Africa than in other developing countries. The slowdown in growth rates in these countries during the seventies and eighty was mainly explained by changes in the terms of trade. Among the indicators of economic vulnerability they have chosen, the instability of terms of trade weighted by the ratio of exports to GDP.

Becker and Mauro (2006), were used in their analysis on a data set covering developed and developing countries over the period 1970-2001, a multivariate probit model. They found that on average, a drop of 10 percent in terms of trade leads to a decrease of 2.8 percent per year of economic growth.

Samimi *et al.* (2011) evaluated the impact of the volatility of terms of trade on economic growth in 20 oil-exporting countries using GMM estimation (generalized method of moments) over the period 1980-2005. These countries are heavily dependent on exports of primary products (oil). Their results indicate that the volatility of terms of trade has a negative impact on economic growth.

Many studies have shown that institutional quality is an important determinant of economic growth:

North (1991) emphasizes the importance of effective institutions as a determinant of economic performance. According to this author, effective institutions reduce transaction and production costs so that the potential gains from trade are realized. By establishing a stable structure of trade where there is interaction between individuals and institutions, they reduce uncertainty "raised insufficient information about the behavior of other individuals in the process of human interaction." It passes through a reduction of information asymmetries, risk reduction through the respect for rights and property contracts.

Rodrik and Subramanian (2003) provide an important role to institutions in promoting economic development, in particular the role of property rights and the rule of law. In this perspective, what matters for growth, are the rules of a society as defined by standards explicit and implicit behavior and their ability to create appropriate incentives for desirable economic behavior.

According to Acemoglu (2008) the good institutions in a country may encourage investors by creating incentives to adopt investment and technological innovation. They give the opportunity to accumulate human capital for its workers and generating economic growth. Otherwise, bad institutions discourage such activities leading to stagnation. In addition, good institutions can motivate politicians to work better and create an environment enhancing economic growth.

Rodrik (2008) considers that good governance is a tool to achieve better policies and improved economic performance. He considers that a government that sets the attributes of good transparency, effectiveness, rule of law, lack of corruption, where there is voice and participation is a developed state that is suitable for improving economic growth.

Other studies have shown that political institutions play an important role in mitigating or amplifying the negative effects of economic vulnerability on growth depending on whether they are good or bad.

The empirical results of Rodrik (1999) on the countries of Latin America and the Middle East over the period 1960 to 1975 and from 1975 to 1995, have shown after 1975, that countries that have been characterized by their weak institutional quality (represented by indicators of institutional quality of governance, the rule of law and democratic rights) and who have experienced domestic social conflicts are those were affected by the collapse of their economic growth. He shows that social conflicts interact with external shocks on the one hand and political institutions on the other hand. These interactions play an important role in determining the persistence of the economic growth of a country. They determine the response to the volatility of the external environment and the extent of the collapse of economic growth following a negative shock. According to Rodrik (1999), the low quality associated with exogenous shocks such as declining terms of trade institutional policies generate negative economic costs on economic growth. He concludes that it is important to improve the quality of political institutions. According to its results, participatory and democratic institutions and the rule of law are elements of a strategy to increase the resistance to the volatility of the external environment.

Guillaumont (2006) argues that institutions play a key role in mitigating the negative effects of the economic vulnerability of growth and help countries in the effective management of external shocks.

## 3. EMPIRICAL SECIFICATION AND RESULTS

In this section, we try to show through our estimates that good governance has an impact in mitigating the adverse effects of instability of terms of trade on economic growth. We present the methodology, the data used and the estimation results.

### 3.1. Methodology and Model

We conduct a dynamic panel data for 15 Sub-Saharan Africa countries over the period 1996-2011. In 2011, primary products accounted for more than 70% of the exports of these countries, which are: Burkina Faso, Congo Republican, Central African, Republic Benin, Ethiopia, Gambia,

Cameroon, Comoros, Malawi, Zimbabwe, Cape Verde, Swaziland, Zambia, Rwanda and Nigeria. We could include a larger number of countries in our sample, but we were constrained by the limitations of the data.

On the whole sample, the average growth is 4.1% per year, with a standard deviation of 4.2%, implying a high volatility of production. The average of the indicator of economic vulnerability that reflects terms of trade volatility is 17.7%. We calculated for each country in the region of Sub-Saharan Africa the average value of the indicator of economic vulnerability over the period 1996-2011. The most vulnerable countries are: Nigeria (44.23), Republican Congo (85.82), Cameroon (30.86), Zambia (22.94) and Rwanda (21.05). Indeed, these countries are exporters of primary products (petroleum, ores, base metals) which are most vulnerable to the impact of terms of trade. Indeed, these countries are heavily dependent on the import demand for these products and hence their world price.

To estimate our model, we use the generalized method of moments (GMM) dynamic panel. Two main econometric tests are considered in the estimation GMM dynamic panel: the autocorrelation test errors and tests of identification or validity of instruments Sargan / Hansen. The Arellano and Bond autocorrelation tests examines if there is presence of autocorrelation of errors or not. The second test (Sargan / Hansen) tests the hypothesis overall validity of the instruments.

The equation to be estimated in our study connects economic growth, economic vulnerability, variables that reflecting the governance and control variables.

At first, we estimate the following model:

$$Y_{it} = A_0 + A_1.Y_{it-1} + A_2 Open_{it} + A_3..Vu\ln_{it} + .A_4 X_{it} + A_5.I_{it} + \sigma_i + \varepsilon_{it} \qquad (1)$$

Where

$Y_{it}$ measures the real GDP growth rate of the country $i$ at time $t$.

$Y_{it-1}$ measures the delayed real GDP growth rate of the country $i$.

$Open_{it}$ is the trade openness rate calculated as the ratio of exports plus imports to GDP.

$Vu\ln_{it}$ is the economic vulnerability indicator. This indicator is measured as the weight of the standard deviation of terms of trade by the ratio of trade openness of the opening of the country i. As Rodrik (1999), we apply this formula:

$$VE = \sigma_{TE} * \left[(X + M)/PIB\right]$$

Where:

$\sigma_{TE}$ is the standard deviation of terms of trade;

$(X + M)/PIB$ is the trade openness rate.

$X_{it}$ represents the vector of economic control variables that have an impact on economic growth:

- The level of initial GDP/ capita (in logarithm). This indicator is used to test the conditional convergence.
- Government spending (in logarithm).
- Population rate.

Data for these variables are extracted from the database of the World Development Indicators Database (2012).

$I_{it}$ represents the institutional quality of the country i measured by six indicators of Kaufman and al. These indicators are: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption. These variables range from -2.5 to +2.5. (The value of -2.5 indicates that there is very bad governance and a value of +2.5 indicates that there is good governance). The definitions of these variables are reported in the Appendix. Data for these variables are extracted from the database of the Worldwide Governance Database (2012).

$\sigma_i$ is a country specific effect

$\varepsilon_{it}$ is an error term.

Second, we study the impact of economic vulnerability on growth taking into account the interactive effect commercial open-institutions by estimating the following model:

$$Y_{it} = A_0 + A_1.Y_{it-1} + A_2 Open_{it} + A_3..Vu\ln_{it} + .A_4 X_{it} + A_5.(I_{it} * Open_{it}) + \sigma_i + \varepsilon_{it} \quad (2)$$

Where

$(I_{it} * Open_{it})$ is the interactive term institutions-commercial openness.

### 3.2. Empirical Results

We first present the different results from the dynamic panel estimation of the effects of shocks in terms of trade on economic growth in the presence of modes of governance for 15 sub-Saharan Africa countries for the period 1996 to 2011. In all regressions, the results of tests on identification Sargan / Hansen support the null hypothesis that the instruments are valid. In addition, the autocorrelation tests of Arellano and Bond order errors (2) accept the null hypothesis of no autocorrelation of errors between the variables and the error term. The estimation results are presented in Table 1:

**Table-1.** Impact of economic vulnerability on economic growth depending on the mode of governance GMM ESTIMATION: dependent variable: growth rate of economic yt

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| $yi_{t-1}$ | 0.429** (2.42) | 0.787*** (3.60) | 0.596*** (9.59) | 0.497* (1.92) | 0.374* (2.09) | 0.691* (1.95) | 0.714*** (12.77) |
| $Vuln_{it}$ | -0.0029*** (-7.45) | -0.0014** (-2.51) | -0.0005* (-1.85) | -0.0015*** (-4.04) | -0.0015** (-2.63) | -0.0026*** (-4.28) | -0.0014*** (-3.13) |
| Open | 0.175*** (7.50) | 0.007 (0.11) | 0.004 (0,22) | 0.038* (1.80) | 0.098* (1.93) | 0.040** (2.88) | -0.075 (-1.55) |
| Government spending | -0.0027 (-1.26) | 0.0005 (0.19) | -0.002 (-0.90) | 0.002 (0.47) | -0.003 (-1.36) | -0.0008 (-0.21) | -0.002 (-1.02) |
| Population | 0.020*** (5.49) | 0.033** (2.69) | 0.013** (2.77) | 0.027 (2.47) | 0.035* (1.91) | 0.036 (3.76) | 0.006 (1.22) |
| LnGDP/capita ($t_0$) | -0.092* (-2.12 ) | 0.060 (1.25) | 0.015 (0.80) | 0.009 (0.64) | -0.031** (-2.18) | 0.026 (1.68) | 0.039 (1.13) |
| | | | | | | | *Continue* |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Regulatory quality | | 0.062** (1.97) | | | | | |
| Voice and accountability | | | 0.040* (2.10) | | | | |
| Control of corruption | | | | 0.029** (2.72) | | | |
| Rule of law | | | | | 0.014* (1.88) | | |
| Government effectiveness | | | | | | 0.019 ** (2.24) | |
| political stability and absence of | | | | | | | 0.027 ** (2.24) |
| Constant | -0.146 (-0.56) | -0.419*** (-3.27) | -0.089 (-1.56) | -0.096 (-1.03) | -0.235 (-1,13) | -0.355 *** (-3.53) | 0.111** (2.20) |
| Observations | 160 | 126 | 131 | 131 | 131 | 131 | 131 |
| AR(2) P Value | 0.402 | 0.654 | 0.844 | 0.578 | 0.676 | 0.480 | 0.468 |
| Sargan Test P | 0.814 | 0.994 | 0.362 | 0.305 | 0.328 | 0.439 | 0.106 |
| Hansen Test P | 0.693 | 0.852 | 0.899 | 0.612 | 0.416 | 0.859 | 0.584 |

*, **, *** significant at 10%, 5% and 1% level. Student's t-test in parentheses.

The results in Table 1 show that the economic vulnerability as measured by the impact of instability terms of trade in all regressions model has a negative effect on economic growth. The negative and significant sign of the coefficient of economic vulnerability is expected. Indeed, the impact of terms of trade fluctuations contributes to the instability of economic growth. As expected, a greater exposure to external turbulence has the effect of significantly lower economic growth. The estimation results confirm our thesis that good governance reduces the negative impact of economic vulnerability on economic growth. Indeed, by successively adding a one indicator of governance among those selected in regressions, we notice the decrease in absolute value of the coefficients of economic vulnerability inked to volatile terms of trade. The introduction of governance indicators mitigates the negative impact of shocks terms of trade on economic growth. This analysis shows the important role that good governance can play in reducing the negative effects of the economic vulnerability to economic growth. Indeed, in the absence of indicators of good governance, economies have high economic vulnerability (equation 1 of model).

On the effects of governance indicators on economic growth, integrating each one of the six indicators, the results indicate the existence of a positive relationship between institutional quality and economic growth. The direct effect of the quality of institutions on economic growth is positive and significant. This finding show that growth depends positively on the good quality institutions.

The trade openness coefficient is generally positive and significant showing its positive impact on economic growth. This is consistent with many theoretical and empirical studies suggesting that trade openness promote growth through the development and transfer of technology, better allocation of resources, ect.

In Table 2, we present the results of the estimation of the effects of shocks to the terms of trade on economic growth in the presence of interaction effects between openness and modes of governance.

**Table-2.** Impact of economic vulnerability on economic growth in the presence of interaction effects between commercial openness and modes of governance GMM ESTIMATION: dependent variable: growth rate of economic yt

| Variables | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $y_{t-1}$ | 0.429*** (6.40) | 0.577*** (6.84) | 0.420* (1.86) | 0.239** (2.41) | 0.594** (2.41) | 0.502 *** (4.71) |
| $Vuln_{it}$ | -0.0027* (-2.14) | -0.0005** (-2.35) | -0.0011* (-2.04) | -0.0009** (-2.18) | -0.0011 *** (-3.97) | -0.0006* (-1.82) |
| Open | 0.16** (2.76) | 0.0011 (0.02) | 0.06* (2.41) | 0.04** (2.77) | 0.054** (2.17) | 0.006 (0.13 ) |
| LnGDP/capita ($t_0$) | -0.0215 (-0.76) | 0.019 (0.64) | -0.016 (-0.97) | 0.012 (0.65) | 0.010 (0.89) | 0.007 (0.33) |
| Government spending | 0.0005 (0.17) | -0.002 (-1.25) | 0.0006 (0.09) | -0.002 (-2.00) | -0.0003 (-0.2) | -0.003* (-2.05) |
| population | 0.025* ( 2.10) | 0.0145*** (3.76) | 0.017 (1.10) | 0.045* (1.90) | 0.023*** (3.75) | 0.015 (1.67) |
| Open * Regulatory quality | 0.0658** (2.86) | | | | | |
| Open * Voice and accountability | | 0.0080* (1.98) | | | | |
| Open * Control of corruption | | | 0.0262* (2.03) | | | |
| Open * Rule of law | | | | 0.0203** (2.27) | | |
| Open * Government effectiveness | | | | | 0.0278*** (3.59) | |
| Open * political stability and absence of violence | | | | | | 0.032*** (3.27) |
| Constant | 0.056 (0.35) | -0.108 (1,28) | 0.060 (0.54) | -0.152 (-0.97) | -0.116 (-1.69) | -0.046 (-0.30) |
| Observations | 131 | 131 | 131 | 131 | 131 | 131 |
| AR(2) P Value | 0.269 | 0.729 | 0.609 | 0.115 | 0.461 | 0.418 |
| Sargan test P Value | 0.293 | 0.544 | 0.398 | 0.207 | 0.477 | 0.1 |
| Hansen test P Value | 0.870 | 0.916 | 0.577 | 0.889 | 0.747 | 0.624 |

*, **, *** significant at 10%, 5% and 1% level. Student's t-test in parentheses

In table 2, the estimation results indicate that even in the presence of interaction terms between trade openness and good institutional quality, the impact of terms of trade instability in all regressions model has a negative and significant effect on economic growth. However, these interaction terms between openness and good governance mitigate the negative effects of the economic vulnerability to economic growth. The main conclusion we draw from this analysis is

that the interaction between good institutional quality and trade openness can mitigate the negative effects of the economic vulnerability due to fluctuations in the terms of trade.

The results show that the indicator of trade openness has a positive effect on economic growth. In addition, institutions seem to have an impact on trade efficiency at high levels of openness. Indeed, the coefficients of the interaction terms between openness and institutions are positive and significant. However, special attention must be taken when the interpretation of the total effect of trade liberalization because it depends on institutional development.

We suppose that trade openness acts directly on economic growth through the coefficient $A_2$ and indirectly and conditioned by the institutional level through the coefficient $A_5$.

Given the equation of the model (equation (2)), the total effect of trade openness can be shown as follows:

Total effect of trade openness = $\left(A_2 + A_5.\bar{I}\right)Open_{it}$

Where

$\bar{I}$ is the average measure of institutional quality,

$A_2$ is the coefficient of trade openness,

$A_5$ is the coefficient of interaction term between trade openness and institutional quality.

Through the interaction term commercial openness-institutional quality, we calculate the thresholds of institutional development, from which trade liberalization has a positive effect on economic growth. That is to determine at what level of institutional quality, openness to trade is beneficial to economic growth in Sub-Saharan African countries. Trade openness can stimulate economic growth depending on institutional quality. To calculate the threshold effect, we assume that the total effect of openness is positive:

$$\left(A_2 + A_5.\bar{I}\right)Open_{it} \succ 0$$

$$A_2 + A_5.\bar{I} \succ 0$$

Threshold of institutional quality = $-A_2 / A_5$

We report the results of our calculations in table 3 where column (A), defers total effect of an increase of one unit of trade liberalization when the institutional variable is measured as the average value in the sample group (column ( B)). Column (C) indicates the level of the threshold above which institutional variable; trade openness has a positive impact on economic growth.

Through our calculations presented in Table 3, it is from the threshold of the indicator of "regulatory quality" of (-2.43) that trade openness has positive effects on economic growth: from this threshold, any increase in the opening of a one unit, has the effect of increasing the economic growth of 0.142 if we use the average of this indicator (-0.267). Below the threshold value of the "regulatory quality" indicator, trade openness negatively affects economic growth.

For the indicator "government Effectiveness" is from the threshold of (-1.94) that trade openness positively influences economic growth. Trade openness influences positively economic growth from the threshold of -1.97, for the indicator “Rule of law”.

**Table-3.** The Effects of Increased Trade Openness on Economic Growth of a Unit and Threshold Effects

| Governance indicators | Total effect of trade openness (A) | $\bar{I}$ (B) | threshold effect (C) |
|---|---|---|---|
| Regulatory quality | 0.142 | -0.267 | -2.43 |
| Control of corruption | 0.054 | -0.217 | -2.29 |
| Rule of law | 0.036 | -0.178 | -1,97 |
| Government effectiveness | 0.048 | -0.190 | -1.94 |

**Source:** Author's Computation

## 4. CONCLUSION

According to recent research, economic vulnerability negatively affects economic growth due to the instability of terms of trade. We have estimated growth equations on a panel of annual data from 15 sub-Saharan African countries from 1996 to 2011. We choose the region of Sub-Saharan Africa because they are countries with low incomes who are heavily primary products exporters that are largely dependent on global import demand

We find in first time that economic vulnerability has a negative impact on growth and that the implementation of good governance helps to mitigate these negative effects on economic growth. In second time, taking into account the interactive effect of institutions and trade openness, we have shown through our empirical results that trade openness can positively influence economic growth until a threshold of institutional development. Taking into account the important role played by the good institutions to promote growth and mitigate adverse effects of instability of terms of trade on economic development, most of governments of sub-Saharan African countries must promoting governance for more prosperity luck.

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## APPENDIX

### I. List of Sub-Saharan countries

1. Burkina-Faso
2. Congo. Republican
3. Central African
4. Republic Benin
5. Ethiopia
6. Gambia
7. Comoros
8. Malawi
9. Zimbabwe
10. Cameroon
11. Cape Verde
12. Swaziland
13. Zambia
14. Rwanda
15. Nigeria

### II. Institutional variables

**1. Voice and Accountability**: This dimension measures the way in which a country's citizens are able to participate in selecting their government. This indicator also measures the freedom of press, freedom of association and freedom of the media.

**2. Political Stability and Absence of Violence:** This indicator shows the extent to which a government can be destabilized or overthrown by unconstitutional or violent means, including terrorism.

**3. Government Effectiveness (GE)**: This indicator measures the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation and the credibility of the commitment government policies.

**4. Regulatory Quality (RQ)**: This indicator captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and encourage promoting private sector development.

**5. Rule of Law:** This indicator captures perceptions of agents' confidence in the rules of society, including the quality of contract enforcement, property rights and the police.

**6. Control of Corruption:** This indicator measures how public power is exercised for private gain, including both large and small forms of corruption, as well as "capture" of the state by an elite.